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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/539,872 | 03/31/2000 | Ravin Balakrishnan | 1252.1047 | 9242 |
| 21171 | 7590 | 08/25/2006 | | |
| STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005 | | | EXAMINER NGUYEN, KIMBINH T | |
| | | | ART UNIT 2628 | PAPER NUMBER |

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 09/539,872 | Applicant(s) BALAKRISHNAN ET AL. | |
| | Examiner Kimbinh T. Nguyen | Art Unit 2628 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21, 24-27, 29, 30 and 42 is/are allowed.
- 6) ☒ Claim(s) 1-20, 22, 23, 28 and 31-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to amendment filed 06/29/06.
2. Claims 1-42 are pending in the application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 6, 8-10, 16-18, 20, 36 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danisch (6,127,672) in view of Kikuchi et al. (5,811,051).

Claim 1, Danisch discloses a flexible handheld tape (ribbon) device (column 4 lines 20-28), comprising a flexible tape (ribbon) having relative position sensing elements spaced along the tape (col. 3 lines 49-55) and producing relative tape positions relative to a reference position sensing element of the tape (column 3 lines 45-58); and a curve generation system producing a smooth virtual tape curve by mapping the relative positions to positions of the virtual tape curve (sampling curvatures at multiple locations, space intervals along a supporting substrate which is flexible; col. 3, lines 63-67; col. 4, lines 65-67). Danish teaches motion measuring tool (a ribbon type tape substrate) is a virtual tape because it is used in a human motion capture application in fig. 38, Danish does not teach producing a smooth virtual curve; however, Kikuchi et al. teaches a cross-sectional shape substantially equal to that of the fiber reinforced plastic rod to be molded with the tape wound around the fiber bundle to

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thereby obtain a product having a smooth finishing surface (col. 4, lines 1-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a taper taught by Kikuchi into an instrumented planar tape of the flexible ribbon type of Danisch for producing a smooth finishing surface curve, because since the tape wound up around the surface of the fiber bundle bites surface through the gradually increasing pressure application along the taper shape of the mold inlet portion thereby obtain a product having a smooth finishing surface. The bending or fluctuating of the fiber bundle and the twisting of the fibers at the tape wind up time can be also prevented (col. 4, lines 43-45).

Claim 2, Danisch discloses wherein tape is dynamically adjustable and curve shape corresponds to the tape shape (bend and twist; col. 15, lines 7-20).

Claim 3, Danisch discloses wherein the curve is part of a surface and a shape of the surface corresponds to the curve shape (column 3 lines 30-33).

Claim 6, the rationale provided in the rejection of claim 1 is incorporated herein. In addition, Danisch teaches the tape curve sets an object profile curve (col. 9, lines 42-46).

Claim 8, the rationale provided in the rejection of claim 1 is incorporated herein. In addition, Danisch teaches the tape curve sets a path curve (the tape passes; col. 16, lines 18-25).

Claim 9, Danisch discloses wherein the tape curve specifies a surface shape along the path curve (col. 16, lines 6-10).

Claim 10, the rationale provided in the rejection of claim 1 is incorporated herein. In addition, Danisch teaches the flexible curve provides a profile and an object is created by revolving the profile curve in a scene (col. 9, lines 42-45).

Claim 16, the rationale provided in the rejection of claim 1 is incorporated herein. In addition, Danisch discloses an animation system using the relative positions as a command (terminating at the free end with a body capable of Cartesian positioning; col. 16, lines 32-37).

Claim 17, Danisch discloses wherein a shape of the input device flexible tape indicates a command (column 6 lines 53-60).

Claim 18, the rationale provided in the rejection of claims 1 and 16 are incorporated herein. In addition, Danisch discloses an end portion of the flexible tape is used for input command gestures (terminating at the free end with a body capable of Cartesian positioning; col. 16, lines 32-37).

Claim 20, the rationale provided in the rejection of claim 18 is incorporated herein. In addition, Danisch discloses an end portion of the flexible tape is used for a selection control command (see section 3.4.2, page 210).

Claim 36, Danisch discloses a flexible tape device producing shape, twist and six degrees of freedom position information (col. 14, lines 1-3; col. 16, lines 35-37), and display means displaying a virtual curve having a shape (column 3 lines 45-60), a twist and position corresponding to the shape, twist and six degrees of freedom position information (col. 14, lines 1-3, col. 16, lines 35-37).

Claim 41, Danisch teaches adjusting a shape of a flexible tape having position sensors producing relative tape positions (the instrumented tape is affixed to desired body portions by adhesive tape 70; col. 16, lines 1-5); mapping the relative tape positions to a virtual curve using the flexible tape 9col. 3, lines 46-67); displaying the virtual curve (the output from the computer 69 can provide a video display of the geometric configuration of the shape measuring tool in space; col. 16, lines 26-29).

5. Claims 11, 22, 23 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danisch (6,127,672) in view of Kikuchi et al. (5,811,051) and further in view of Krishnamurthy (6,256,039).

Claim 11, the rationale provided in the rejection of claim 1 is incorporated herein. In addition, Krishnamurthy teaches the tape curve is a spline curve and the relative tape positions are used as control points of the tape curve (col. 9, lines 3-6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the spline curve taught by Krishnamurthy into an instrumented planar tape of the flexible ribbon type of Danisch for producing a smooth tape curve, because it would provide a curve smoothing procedure that attracts a curve surface to a space curve (col. 8, lines 24-26).

Claims 22 and 23, the rationale provided in the rejection of claim 1 is incorporated herein. In addition, Krishnamurthy discloses editing system editing one of curves and surfaces responsive to the relative position (col. 6, lines 5-8); a virtual scene includes a scene curve and said curve generation system edits the scene curve responsive to the tape curve (col. 48-60. It would have been obvious to one of ordinary skill in the art at

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the time the invention was made to incorporate flexible editing tool taught by Krishnamurthy into an instrumented planar tape of the flexible ribbon type of Danisch, because it would provide curve editing operation more efficient, the curve is visualized using a piecewise linear reconstruction through its constituent face points (col. 6, lines 13-15).

Claim 32, the rationale provided in the rejection of claim 1 is incorporated herein.

In addition, Danisch discloses the flexible tape is conformed to a shape of a physical object and the tape curve comprises an input of the shape (col. 16, lines 6-10; col. 19, line 15 through col. 20, line 8).

6. Claims 4, 5, 7, 12-15, 19, 28, 31, 33-35, 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danisch (6,127,672) in view of Kikuchi et al. (5,811,051) and further in view Shaw et al. "Two-Handed Polygonal Design", ACM 1994.

Claim 4, Danisch discloses a flexible handheld tape (ribbon) device (column 4 lines 20-28) comprising a flexible tape (ribbon) having relative position sensing elements spaced along the tape (column 3 lines 49-55), and producing relative tape positions relative to a reference position sensing element of the tape (column 3 lines 45-58); and a curve generation system producing a smooth tape curve using the relative positions as positions of the tape curve (column 3 lines 29-33 and 45-58, abstract, the shape of the surface could be a curve if the substrate is bent); Danisch does not teach producing a smooth curve; however, Shaw et al. teaches producing a smoothing curve (smooth surfaces such as bicubic patches; see section "Introduction", page 205);

wherein a scene (the real world scene or a panoramic view of the scene) includes an anchor curve (bicubic patches) and the tape curve drags out a surface shape from the anchor curve responsive to movement of the flexible tape (dragging the control points to the desired position; see section 2.1, 2.2, page 206). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the smoothing curve and dragging out a surface shape taught by Shaw into an instrumented planar tape of the flexible ribbon type of Danisch for producing a smooth tape curve, because the use of smooth surfaces, it would help the designer understand its shape and using a 3D device for dragging out, it would allow the user to directly manipulate the objects of interest without intermediate steps (see section "Introduction", page 205).

Claim 5, Danisch discloses wherein the surface is created by interpolation between the anchor curve and the tape curve (col. 8, line 61 through col. 9, line 4).

Claim 7, Shaw et al. discloses wherein the tape curve provides a path to drag out an object shape along the profile curve (dragging the control point to the desired position; see section 2.1, page 206). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate dragging out a surface shape taught by Shaw into an instrumented planar tape of the flexible ribbon type of Danisch, because it would help the designer understand its shape and using a 3D device for dragging out, it would allow the user to directly manipulate the objects of interest without intermediate steps (see section "Introduction", page 205).

Claim 12, the rationale provided in the rejection of claim 4 is incorporated herein.

In addition, Danisch discloses a world position sensor attached to the flexible tape and providing a three dimensional world position of the tape (the flexible tape is capable of actually measuring the shape of the human being; col. 15, line 63 through col. 16, line 25; col. 18, lines 20-43) and said curve generation system positions the tape curve in a virtual scene in correspondence to the world position (a defined location on the human skeleton; col. 16, lines 18-25).

Claim 13, Danisch discloses wherein said world position sensor senses three dimensional world orientation of said world sensor and said curve generation system positions the tape curve in a virtual scene in correspondence to the world orientation (col. 15, line 63 through col. 16, line 25; col. 18, lines 20-43; a defined location on the human skeleton; col. 16, lines 18-25).

Claim 14, the rationale provided in the rejection of claim 4 is incorporated herein. In addition, Shaw et al. discloses an input command and the curve generation system controls the tape curve responsive to the input command (input commands to manipulate the control points of the 3D surface; see section "Introduction", page 205).

Claim 15, the rationale provided in the rejection of claim 4 is incorporated herein. In addition, Shaw et al. discloses the command input device comprises buttons on a position locator and a portion of the flexible tape (see section 1 "Introduction", section 2.1).

Claim 19, the rationale provided in the rejection of claims 1 and 16 are incorporated herein. In addition, Shaw discloses an end portion of the curve is used for

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a cursor control command (see section 3.4.2, page 210). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a cursor control taught by Shaw into an instrumented planar tape of the flexible ribbon type of Danisch for helping the user selecting refinement level of surface curve, because it would allow the user quickly step in and out of select-everything mode in the level selection window (see section 3.4.2).

Claim 28, the rationale provided in the rejection of claim 4 is incorporated herein. In addition, Danisch teaches a user controllable gain controlling relative positions of the tape curve responsive the relative positions of the flexible tape (col. 15, lines 12-62).

Claim 31, the rationale provided in the rejection of claim 4 is incorporated herein. In addition, Danisch discloses the tape curve dynamically controls curves in a dynamic scene responsive to the flexible tape (bend and twist; col. 9, lines 17-37).

Claim 33, the rationale provided in the rejection of claim 4 is incorporated herein. In addition, Danisch discloses the device includes subsection specification sensors (8 sensor pairs; col. 14, lines 1-29) and said tape curve shape is responsive to subsection shape (col. 14, lines 4-29).

Claim 34, the rationale provided in the rejection of claim 4 is incorporated herein. In addition, Danisch discloses a two-dimensional surface upon which said device rests and upon which surface a shape of said device is changed (cartesian positioning; col. 16, line 34; the tape can be placed on any surface like a table); and a world position

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input device specifying a world position of the tape curve (x, y, z location and roll, pitch and yaw orientation; col. 16, lines 34-37).

Claim 35, the rationale provided in the rejection of claims 1, 4, 11, 12 and 22 are incorporated herein.

Claims 37 and 38, Danisch discloses adjusting a shape of a flexible tape (ribbon, column 3 lines 45-60 and column 4 lines 20-35); and producing a virtual curve using the flexible tape (ribbon) as control points of a non-uniform rational B-spline curve (see the rejection of claims 11 and 35).

Claim 39, Danisch discloses a graphical user interface (column 3 lines 29-33) comprising a virtual non-uniformed rational B-spline tape (see the rejection of claims 11 and 35) curve manipulable in a scene responsive to a physical flexible tape (column 3 lines 45-60).

Claim 40, Shaw et al. discloses adjusting a shape of a flexible tape with two hands (two handed interaction; see sections 3.3, 3.4); and Danisch teaches producing a virtual curve using the flexible tape (col. 16, lines 6-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the flexible tape taught by Danisch into the Two-handed polygonal surface design of Shaw for producing a virtual curve, because it would provide a measuring tool (producing a virtual curve) with a high capacity for compliance with a curved surface (col. 9, lines 28-29).

Allowable Subject Matter

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7. Claims 21, 24-27, 29, 30 and 42 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Prior art of reference fails to disclose a user controllable gain on a tape with sensors, wherein tape is displayed egocentrically to the user in a scene in which the tape curve is interacting within changes in viewpoint, wherein the flexible tape comprises a physical constraint comprising one of a substitutable mechanical stiffness member, a physical lock and a shape retaining member.

Response to Arguments

8. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimbinh T. Nguyen whose telephone number is (571) 272-7644. The examiner can normally be reached on Monday to Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Friday from 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached at (571) 272-7664. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 22, 2006

A handwritten signature in black ink, appearing to read "Kimbinh T. Nguyen".

KIMBINH T. NGUYEN
PRIMARY EXAMINER